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(54) Method for Relaxing and then Imparting Controlled Curvature to Curly or Kinky Hair

(57) Curls or kinks in human hair are relaxed and then a controlled curvature is given to the hair, by:

(a) applying to the hair, including the scalp portions thereof, a curl relaxing composition comprising a blend of water and a salt of an acid, which composition has a pH less than 7 but more than 5 and reduces the disulphide linkages of the hair keratin, while manipulating the hair by hand action and/or combining into a partially straightened condition;

(b) submitting the partially straightened hair to a heat treatment at a temperature above human body temperature while simultaneously maintaining the moisture content of the treated hair substantially constant until the hair exhibits a partially relaxed condition;

(c) water rinsing the relaxing composition from the partially relaxed hair and the scalp;

(d) at least partially removing the water to achieve an at least towel blotted state;

(e) wrapping the treated hair onto hair curling devices of such size and shape as to produce the desired curvature in the hair;

(f) applying to the wrapped hair a permanent waving composition comprising an alkaline mercaptan and free alkali, in a concentration such that the disulphide linkages of the hair keratin are reduced and the hair takes up the curvature of the curling devices;

(g) water rinsing the permanent waving composition from the hair; and

(h) applying a neutralizing agent to the hair to reform the disulphide linkages in the hair keratin.

A package for use in this method holds containers containing the compositions defined in (a) and (f).

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SPECIFICATION

Method for Relaxing and Then Imparting Controlled Curvature to Curly or Kinky Hair

This invention relates to a process for treating curly or kinky human hair, particularly that naturally formed as undesirably tight small curls or kinks, by treating the hair in succession of steps to first relax the hair sufficiently to partially straighten it, followed by a second treatment to impart soft, larger curls or waves to the hair.

Some persons have hair formed in undesirably small tight curls or kinks. These traits in hair are inherited, and are attributable to irregular bonding of internal portions of the hair. While some persons, whose origin may be traceable to the northern parts of Europe, may have hair which is undesirably curly, it is much more frequently found in persons of Latin, Mediterranean, Hispanic and/or Negroid origins. In order to style excessively curly or kinky hair properly, it has been found necessary to straighten the tight curls or kinks, which may be accomplished by a procedure known as "relaxing" the curled hair. One method of relaxing tightly curled or kinky hair is disclosed in European specification 79302642.8. The method described in that specification is highly acceptable for persons who wish to have relatively straight hair; however, it is frequently more desirable to transform the tightly curled or kinky hair to soft, longer curls, which impart a more natural appearance to the coiffure. Thus, according to the present method, instead of completely straightening the hair, the curls or kinks can be transformed into a more attractive coiffure by partially relaxing the tight curls or kinks in the hair, and then reforming the hair into loose, but manageable curls.

Accordingly, the invention provides a method for relaxing curls or kinks in human hair and then imparting to it a controlled curvature, which method comprises:

(a) applying to the hair, including the scalp portions thereof, a curl relaxing composition comprising a blend of water and a salt of an acid, which composition has a pH less than 7 but more than 5 and reduces the disulphide linkages of the hair keratin, while manipulating the hair by hand action and/or combing into a partially straightened condition;

(b) submitting the partially straightened hair to a heat treatment at a temperature above human body temperature while simultaneously maintaining the moisture content of the treated hair substantially constant until the hair exhibits a partially relaxed condition;

(c) water rinsing the relaxing composition from the partially relaxed hair and the scalp;

(d) at least partially removing the water to achieve an at least towel blotted state;

(e) wrapping the treated hair onto hair curling devices of such size and shape as to produce the desired curvature in the hair;

(f) applying to the wrapped hair a permanent waving composition comprising an alkaline

mercaptan and free alkali in a concentration such that the disulphide linkages of the hair keratin are reduced and the hair takes up the curvature of the curling devices;

(g) water rinsing the permanent waving

composition from the hair; and

(h) applying a neutralizing agent to the hair to reform the disulphide linkages in the hair keratin.

In summary, the curly or kinky hair is first treated with a relaxing composition, and is then subjected to a gentle heating procedure to accelerate the reaction and produce a softening effect, i.e. a partial straightening of the hair. The relaxing procedure is then terminated by removal of the relaxing composition, after which the partially straightened hair is water-wetted, and then wrapped onto curling devices of sufficient size to produce curls of the desired diameter, after which the wrapped hair is treated with an alkaline mercaptan containing free alkali to cause the wrapped hair to take on a curvature commensurate with the curvature of the curling devices on which it has been wound. After a sufficient period of treatment for the hair to assume the new curvature, the mercaptan is removed by water rinsing, and the chemical reaction is terminated by neutralizing the composition to leave the hair in a new curvature. Long soft curls may then be formed in the hair.

It is important to note that the relaxation of the initial curls or kinks in the hair is accomplished by a mildly acidic composition and treatment is conducted for only a limited period of time to partially straighten the hair, and thus elongate the hair, but without treatment sufficient to make the hair entirely straight. This feature is essential, because tightly curled or kinky hair will not, by itself, respond to a normal treatment with an alkaline mercaptan normally used for "permanent waving" of human hair. The acidic treatment is then neutralized by rinsing followed by a treatment with an alkaline mercaptan applied to the hair when the latter has been properly mounted or wound upon hair curling devices, such as curling rods, to impart a new and more desirable curvature to the treated hair.

The steps will now be described and exemplified.

~~As a pre-treatment, the hair and scalp should be cleansed and freed from all forms of soil or other cosmetic or protective coatings. To achieve this, the hair and scalp can be shampooed, thoroughly rinsed, and dried by blotting with a towel.~~

In (a), a curl relaxing composition is applied to the hair. The composition contains essentially a solution of a salt of an acid capable of reducing, or at least partially reducing, the cystine-linkages of hair keratin. The composition preferably contains an aqueous solution of ammonium bisulphite buffered to a pH between 5 and 7. The solution should be applied to the hair so as to saturate it. This can be accomplished by directing and applying the liquid, and then roughly working it into the hair with repeated combing to extend the hair.

The composition preferably contains a material to form a gel-like substance, which not only makes for ready adhesion to the hair, but which also has the advantage of lending body to the treated hair, which aids in the manual manipulation necessary to straighten the hair. Thus, the composition preferably contains a thickener to cause the viscosity of the composition to be between 80,000 and 400,000 centipoises at 25°C. Other ingredients may be included. The pH of the composition is preferably about 5.7.

A specific Example of a relaxing composition is a gel consisting of the following percentages by weight:

- 15 55.55—deionized water;
- 22.00—ammonium bisulphite of 47% concentration dissolved in water;
- 2.50—hydroxy ethyl cellulose as an inert water soluble organic thickener;
- 20 10.00—urea (which breaks down under heat and buffers the pH to 6.2, and also contributes to cause swelling of hair strands for more effective action by the ammonium bisulphite);
- 25 5.00—*isopropanol*, 99% anhydrous (which helps in wetting the hair fibres);
- 1.14—dibasic sodium phosphate (a hydrogen ion contributor which also influences the pH);
- 30 0.46—citric acid (which buffers the pH);
- 1.10—*aqua ammonium* (which buffers the pH);
- 0.05—chelating agent;
- 0.0001—organic dye (simply for colour tint);
- 35 0.20—perfume; and
- 2.00—non-ionic surfactant, present merely to make the perfume dissolve.

Blending of this composition into a homogenous mass can be accomplished by dissolving in the water, the chelating agent, sodium phosphate, citric acid, urea, and hydroxy ethyl cellulose; heating the mixture to about 45°C to facilitate dissolving the cellulose thickener; cooling to about 25°C.; adding the organic dye dissolved in *isopropanol*; adding a blend of the ammonium bisulphite and ammonia; and finally adding a blend of the perfume with the non-ionic surfactant; thorough mixing being conducted at each addition so as to blend the ingredients into a homogenous mass.

The hair is advantageously prepared for receiving the curl relaxing composition by parting the hair from front to back, and from ear to ear creating four sections. The relaxing composition is then preferably applied to the root areas of the hair, beginning with the back sections, and advancing towards the crown, and then to the front sections, leaving the hairline until last. The composition is preferably applied to the hair working outwards from the root portions, and then throughout the hair strands by hand moulding and combing of the hair into a stretched relatively straight condition, with the hair pasted

against the scalp. If the hair is long it should be folded and placed on top of the head.

In (b), the hair is subjected to a heat treatment while substantially maintaining the moisture content of the composition in the hair, advantageously by covering the head with a plastic cap composed of polyethylene or similar plastic material, so that it serves as a barrier to water escape. The covered hair can then be subjected to a heat treatment by surrounding the covered head with a conventional heating hair dryer capable of heating the hair to the desired temperature. Preferably the temperature is between 38 and 50°C. Heat is preferably applied for a period between 5 and 20 minutes. The appropriate time can be determined by periodically examining a strand of hair to determine the effect of the relaxing composition. A visual test of the curl relaxation is that if a portion of the strand of hair adjacent the scalp remains against the scalp, the hair will be generally sufficiently relaxed.

The flexible plastic covering, where one has been employed, can now be discarded.

In (c), the hair and scalp are preferably rinsed thoroughly, preferably with tepid water. In general, rinsing should extend for as much as 5 minutes.

In (d), the hair is preferably towel blotted to a damp condition.

In (e), the hair is advantageously again sectioned, and the hair of each section then divided into strands that are wound onto hair curling devices using a small amount of water to aid in wrapping the individual strands properly in a manner well known to skilled beauticians. The hair curling devices in this step can be conventional curling rods.

In (f), there is applied a permanent waving composition comprising an alkaline mercaptan and free alkali. The composition preferably contains ammonium thioglycolate in proportions between 5% to 10%, especially from 6.5% to about 7.2%, by weight. The composition preferably also contains aqueous ammonia in amount between 1.0% and about 1.35%, especially between 1.18% and about 1.28%, by weight. Conventional permanent waving compositions can be employed.

The permanent waving compositions generally contain, in addition to the ammonium thioglycolate and the free aqueous ammonia, a very high percentage of water, small amounts of surfactants, and a thio-masking composition.

The hair of different people may require different optimum proportions of the ammonium thioglycolate to the free ammonia to form the permanent curls satisfactorily. Any skilled beautician will recognize the variations in hair quality and should be able to choose a permanent waving composition best fitted for the particular natural quality of the hair.

The permanent waving composition is preferably applied in the usual manner to the centre portions of rods on which the hair is

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wound, and allowed to remain in contact with the hair until a distinct waving effect can be observed. Persons who are skilled in the art of hair care treatment will recognize the optimum condition, which can, of course, be tested from time to time by visually observing one or more strands of the treated hair.

When a desired degree of softening and curling of the treated hair has been observed, the permanent waving composition is removed in (g) by water rinsing which should be thorough.

The hair is then preferably removed from the hair curling devices.

In (h), the hair is treated with a neutralizing agent, such as hydrogen peroxide, which acts to neutralize the ammonium thioglycolate and free ammonia.

The hair can then be water rinsed again, dried, and styled in an appropriate manner. Hair which has been treated according to this invention may be set by using any procedure. The hair can be set into waves, or into curls larger than the curls or kinks treated by the present method. It will be found that the hair has lost its original tight curls or kinks, and can be formed in an attractive hairstyle.

The present invention involves relatively gentle treatment of what can normally be unruly hair by first treating it with an acidic composition sufficient to produce enough relaxation of the curls or kinks in the hair so as to make the hair manageable, followed by a relatively mild treatment with an alkaline composition applied to the hair after it has been wound on curling devices, so as to produce soft manageable curls. Thus, persons having curly or kinky hair can have it reformed to give both length and gentle curls, which greatly enhance the appearance of the coiffure.

The present compositions, e.g. the relaxing composition, should of course not injure the hair nor harm the scalp or skin.

The invention provides a package for use in a single performance of the present method, which package is adapted to hold and does hold a first container, containing the curl relaxing composition defined in (a), and a second container, containing the permanent waving composition defined in (f). The package can also be such that it is adapted to hold and does hold a third container, containing the neutralizing agent defined in (h). The present package can be adapted so that its compositions are used in the correct order.

Claims

1. A method for relaxing curls or kinks in human hair and then imparting to it a controlled curvature, which method comprises:

(a) applying to the hair, including the scalp portions thereof, a curl relaxing composition comprising a blend of water and a salt of an acid, which composition has a pH less than 7 but more than 5 and reduces the disulphide linkages of the hair keratin, while

manipulating the hair by hand action and/or combing into a partially straightened condition;

(b) submitting the partially straightened hair to a heat treatment at a temperature above human body temperature while simultaneously maintaining the moisture content of the treated hair substantially constant until the hair exhibits a partially relaxed condition;

(c) water rinsing the relaxing composition from the partially relaxed hair and the scalp;

(d) at least partially removing the water to achieve an at least towel blotted state;

(e) wrapping the treated hair onto hair curling devices of such size and shape as to produce the desired curvature in the hair;

(f) applying to the wrapped hair a permanent waving composition comprising an alkaline mercaptan and free alkali, in a concentration such that the disulphide linkages of the hair keratin are reduced and the hair takes up the curvature of the curling devices;

(g) water rinsing the permanent waving composition from the hair; and

(h) applying a neutralizing agent to the hair to reform the disulphide linkages in the hair keratin.

2. A method according to claim 1 wherein in

(a) the curl relaxing composition is an aqueous solution of ammonium bisulphite buffered to a pH between 5 and 7.

3. A method according to claim 1 or 2 wherein in (a) the curl relaxing composition contains a thickener and has a viscosity of between 80,000 and 400,000 centipoises at 25°C.

4. A method according to any one of claims 1 to 3 wherein in (b) the temperature is between 38 and 50°C.

5. A method according to any one of the preceding claims wherein in (b) the hair is heat treated for between 5 and 20 minutes.

6. A method according to any one of the preceding claims wherein in (f) the permanent waving composition contains between 5 and 10% by weight ammonium thioglycolate.

7. A method according to any one of the preceding claims wherein in (f) the permanent waving composition contains between 1.0 and 1.35% by weight aqueous ammonia.

8. A method according to any one of the preceding claims wherein in (h) the neutralizing agent comprises hydrogen peroxide.

9. A method according to any one of the preceding claims wherein after the water rinsing (g) but before the neutralization (h) the hair is removed from the hair curling devices.

10. A method according to any one of the preceding claims wherein the hair is subsequently set into waves, or into curls larger than the curls or kinks treated by the present method.

11. A method for relaxing curls or kinks in human hair and then imparting to it a controlled curvature, which method is performed substantially as hereinbefore described.

12. A package for use in a single performance of the method claimed in any one of the preceding claims, which package is adapted to hold and does hold a first container, containing the curl relaxing composition defined in (a), and a second container, containing the permanent waving composition defined in (f).

13. A package according to claim 12 which is also adapted to hold and does hold a third container, containing the neutralizing agent defined in (h).

14. A package for use in the method claimed in any one of claims 1—11, which package is substantially as hereinbefore described.

15. A method for relaxing and then adding curl control to excessively curly hair, comprising:

(A) Applying to said hair, including the scalp portions thereof, a curl relaxing composition comprising a blend of water and a salt of an acid having a pH less than 7, but more than 5, and having the capacity of reducing the disulphide linkages of the hair keratin, while manipulating the treated hair by hand action and combing into a partially straightened condition;

(B) submitting said treated hair to a heat treatment at a temperature above human

body temperature while simultaneously maintaining the moisture content of the treated hair substantially constant until said hair exhibits a relaxed condition;

(C) water rinsing said relaxing composition from the hair and scalp, and subsequently removing said water to at least a towel blotted state;

(D) wrapping the treated hair onto a plurality of mechanical devices, each of said devices being of a dimension sufficient to produce curvature in the wrapped hair;

(E) applying to said wrapped hair an alkaline mercaptan and free alkali in a concentration sufficient to initiate reduction of the disulphide linkages of the hair keratin and form soft curls in the hair; and

(F) water rinsing and neutralizing said alkaline composition present on the hair sufficient to permit reformation of the disulphide linkages in the reformed hair keratin, and thereby permit the treated hair to be set and styled in soft larger curls or waves.

16. Each and every novel method, package, composition and method step as described herein or as defined above.

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